

The BALANCE Cruise Report: The Archipelago Sea

18th July – 18th August 2006



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0 **PREFACE**

This cruise report will present a short concise description of the habitat mapping activities conducted by the Geological Survey of Finland in the Archipelago Sea in July and August 2005. This was done as part of the BSR INTERREG IIIB project “BALANCE” The Archipelago Sea is within the BALANCE pilot area 3.

The Joint VALKO- and BALANCE- expedition group in r/v Geola (18.7-18.8.2005) consisted of the following staff members:

Group Leader: Kotilainen Aarno (GTK)

Group: Hirvonen Anu (8. -18.8) (MTL)

Hämäläinen Jyrki (13. -18.8) (GTK)

Puttonen Irma (GTK/The University of Turku)

Reijonen Anu (GTK)

Virtasalo Joonas (16. -18.8) (The University of Turku)

Captain: Häkkinen Ami (18. -31.7)

Aaltonen Asko (1. -18.8.)

Technician: Väisänen Kai

Chef: Leskinen Petteri

This field investigation was a joint expedition between international BALANCE- and national VALKO- projects, because they have similar interests in the Archipelago Sea. The VALKO -project is part of the Finnish Inventory Programme for the Underwater Marine Environment (VELMU). Its' main aim is to develop a collaboration model for the implementation of the field inventories. Harmonization of survey methodology and data classification is an essential part of both projects.

The Joint BALANCE- and VALKO expedition group 2005 wants to thank the Geological Survey of Finland for the opportunity to study underwater diversity in the Archipelago Sea from r/v Geola. Compliments to the whole survey group and to Geola personnel for the help, co-operation, maintenance and pleasant company during the expedition.

For more information on the BALANCE project, please look at www.balance-eu.org. Reports on marine habitat mapping will be available at the site.

Aarno Kotilainen and Anu Reijonen,

The Geological Survey of Finland

1 INTRODUCTION

BALANCE (Baltic Sea Management – Nature Conservation and Sustainable Development of the Ecosystem through Spatial Planning) is an INTERREG III B co-funded project that aims to develop informed marine management tools for the Baltic Sea on the basis of spatial planning and cross-sectoral and transnational co-operation. One of its main objectives is to define marine landscapes for the Baltic Sea and develop marine habitat maps for the four pilot areas.

The field investigations of Geological Survey of Finland (GTK) in summer 2005 concentrated on the BALANCE Pilot area 3, the Archipelago Sea (marked with light blue in picture 1). GTK's activities in the Pilot Area 3 include the development of the Marine Landscapes for the Archipelago Sea pilot area based on the precise geological data available. The purpose of this field investigation was to take sediment and benthic fauna samples from the case study area of Ormskär (Finnish basic map sheet 103210, marked with green in Picture 1) to produce detailed benthic habitat map and to validate the future Marine Landscapes map.

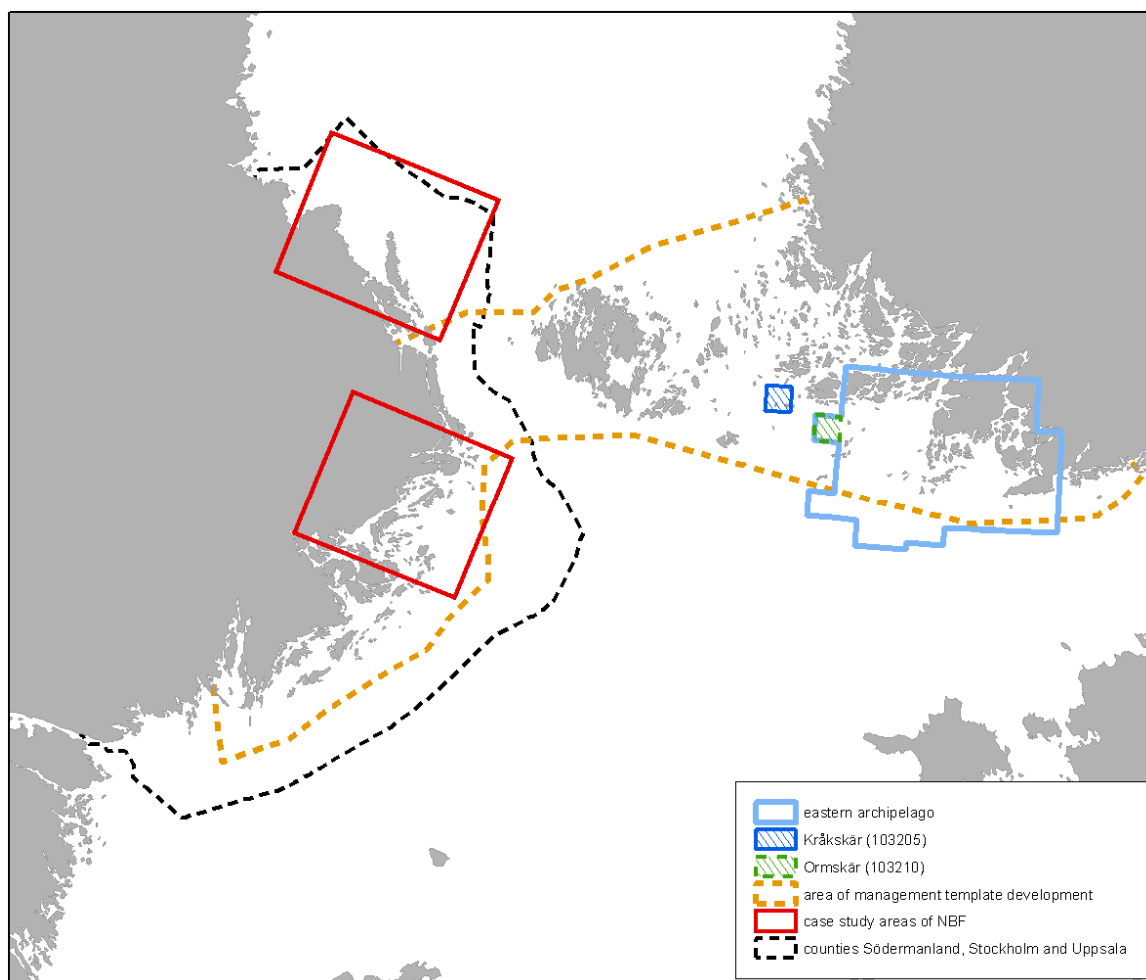


Figure 1. BALANCE pilot area 3 and the case study areas in the Archipelago Sea.

2 **METHODS**

The survey area had previously been sounded with acoustic-seismic methods (echosounder, single channel reflector and sidescan sonar) by the GTK within our national mapping project. To get an extensive picture of the sea bottom we aimed to get samples from diverse bottom types and depths. Therefore were used soundings as a basis for sample site selection.

2.1 **Positioning**

We used DGPS-satellite positioning to locate the vessel. The positioning accuracy was ± 2 m.

2.2 **Underwater video**

Underwater videos were taken from sampling sites less than 30 m deep. The video camera was attached to frame and laid down to sea bottom with a cable. The videos were saved to VHS tapes.

2.3 **Sediment Sampling**

All samples were taken from GTK's research vessel Geola (figure 2).



Figure 2. Research vessel Geola

2.3.1 **Box corer**

We took Box Corer –samples from surface sediments and benthic fauna.

2.3.2 Van Veen

VanVeen –samples were taken from the surface of coarser sea bottoms (like till and gravel).

2.3.3 Vibrohammer corer

Vibrohammer corer was used to take long samples. Device enables even 6 m (12 m) long cores. Inside the vibrohammer corer we had a plastic tube with a diameter of 110 mm.

2.4 Sampling description

BoxCorer and vanVeen –samples were photographed and described sedimentologically. Long sediment samples were described from the splitted (plastic) cores; the surface of the splitted sample was trimmed, photographed, described sedimentologically and sub-sampled.

2.5 Benthic fauna sampling

Benthic fauna samples were taken with Box Corer –device. We took three parallel benthic fauna samples from each sampling site and placed them in separate bowls. All samples were sieved with a sieve of 1.00 mm. A small sample lot was decanted to sieve and every animal was picked to a jar with pincers. In addition, the first sample from each sampling place was sieved with a sieve of 0.5 mm. The samples were stored in formalin (buffered by hexamine) for the later analysis.

2.6 Visual water depth

We analysed visual water depth with white Secchi- plate. We also filed time, weather and wave height.

3 SAMPLE MATERIAL

3.1 Underwater videos

We took underwater videos from nine sampling places (Picture 3, Appendix 1) and the videos were stored to VHS tapes. Unfortunately, there was not enough light in depths over 30 m to support the video photography.

3.2 Sediment samples (*litostratigraphy and photos*)

Altogether 42 samples were recovered from the Ormskär area: 23 Box Corer –samples, 3 vanVeen –samples and 16 vibrohammer samples (figure 3, Appendix 1). Subsamples were delivered for laboratory analyses (e.g. grain-size analyses).

3.3 Benthic fauna samples

We took benthic fauna samples from 15 different places (Appendix 1). From each sampling site we stored one sample of 0.5 mm sieve and 3 samples of 1.00 mm sieve. In together 60 benthic fauna samples were stored.

3.4 Visual water depth measures

Visual water depth was measured with Secchi –plate during favourable weather conditions from all sampling places (Appendix 1).

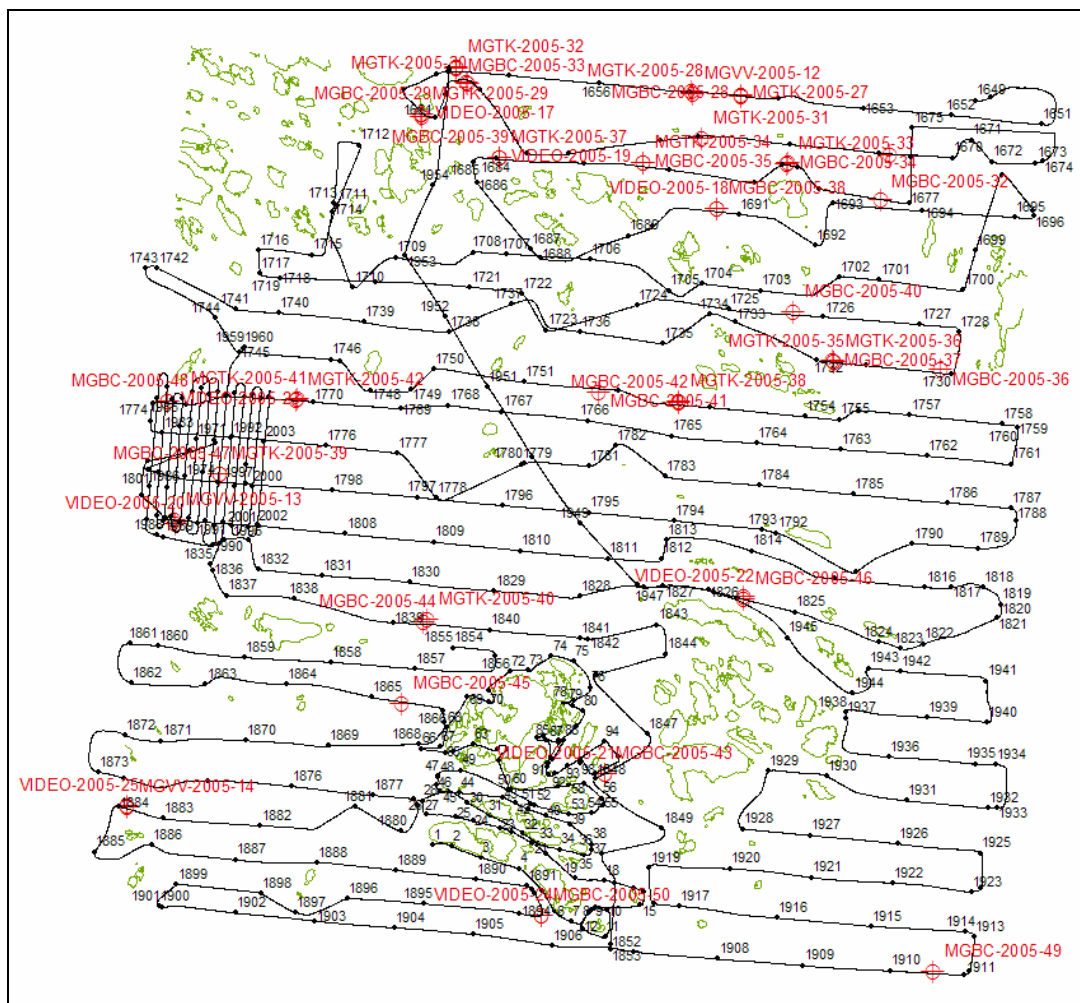


Figure 3. Survey lines (black lines) and sampling locations (red dots) at the Ormskär area.

4 CONCLUSIONS

The purpose of the expedition was fulfilled. We took in together 42 sediment samples from the Ormskär area: 23 Box Corer –samples, 3 vanVeen –samples and 16 vibro-hammer samples. We took benthic fauna samples from 15 different sampling locations and 60 benthic fauna samples were stored. All the samples were taken from variable depths and sediment bottoms to get an extensive picture of the sea bottom. Samples aid to produce habitat map for the survey area and this habitat map is of help in verifying the marine landscapes. BALANCE partners GEUS and NERI are doing similar exercise in Pilot area 1 in summer 2006. The experiences of expeditions should be compared at some point.

About the BALANCE project:

This report is a product of the BSR INTERREG IIIB project "BALANCE".

The BALANCE project aims to provide a transnational marine management template based on zoning, which can assist stakeholders in planning and implementing effective management solutions for sustainable use and protection of our valuable marine landscapes and unique natural heritage. The template will be based on data sharing, mapping of marine landscapes and habitats, development of the blue corridor concept, information on key stakeholder interests and development of a cross-sectoral and transnational Baltic zoning approach. BALANCE thus provides a transnational solution to a transnational problem.

The BALANCE partnership is composed of the following institutions based in 10 countries: The Danish Forest and Nature Agency (Lead), The Geological Survey of Denmark and Greenland, The National Environmental Research Institute, The Danish Institute for Fisheries Research, WWF Denmark, WWF Germany, Institute of Aquatic Ecology at University of Latvia, Estonian Marine Institute at University of Tartu, Coastal Research and Planning Institute at Klaipeda University, Metsähallitus Natural Heritage Service, The Finnish Environment Institute, The Geological Survey of Finland, WWF Finland, The Swedish Environmental Protection Agency, The National Board of Fisheries – Department of Research and Development, The Geological Survey of Sweden, County Administrative Board of Stockholm, Department of Marine Ecology at Gothenburg University and WWF Sweden.

The following institutes contribute as consultants to the partnership: The Geological Survey of Norway, Norwegian Institute for Water Research, DHI Water and Environment, The Leibniz Institute of Marine Sciences, The Sea Fisheries Institute, The Finnish Game and Fisheries Research Institute, Metria Miljöanalys and The Nature Conservancy.

The **BALANCE Report Series** included at the 1st of July 2006:

BALANCE Interim Report No. 1 "Delineation of the BALANCE Pilot Areas".

BALANCE Interim Report No. 2 "Development of a methodology for selection and assessment of a representative MPA network in the Baltic Sea – An interim strategy".

BALANCE Interim Report No. 3 "Feasibility of hyperspectral remote sensing for mapping benthic macroalgal cover in turbid coastal waters of the Baltic Sea".

BALANCE Interim Report No. 4 "Literature review of the "Blue Corridors" concept and its applicability to the Baltic Sea".

BALANCE Interim Report No. 5 "Evaluation of remote sensing methods as a tool to characterise shallow marine habitats".

BALANCE Interim Report No. 6 "BALANCE Cruise Report – The Archipelago Sea".

For more information please see www.balance-eu.org and <http://maps.sgu.se/Portal>